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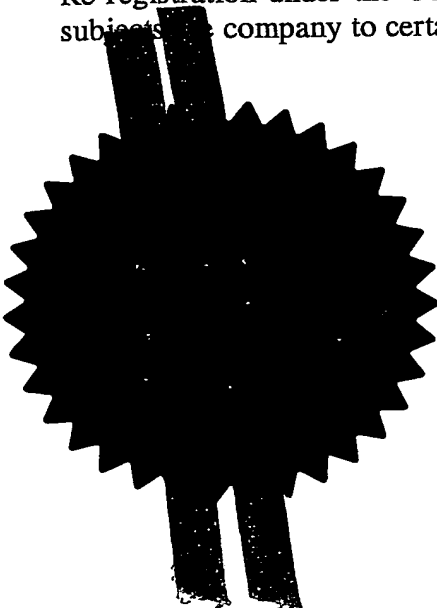
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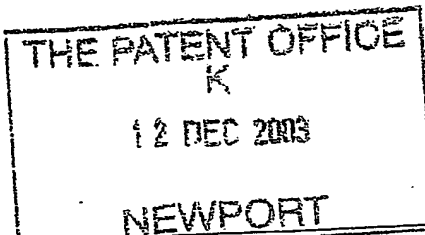
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Dated 21 February 2005

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The Patent Office

Cardiff Road
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1. Your reference

P3138

2. Patent application number
(The Patent Office will fill in this part)

0328774.5

12 DEC 2003

3. Full name, address and postcode of the or of each applicant (underline all surnames)

Huntleigh Technology PLC
310-312 Dallow Road
Luton
Bedfordshire
LU1 1TD

Patents ADP number (if you know it)

506907001

If the applicant is a corporate body, give the country/state of its incorporation

United Kingdom

4. Title of the invention

Intermittent Pneumatic Compression Device

5. Name of your agent (if you have one)

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Shalini Thaker
Group IP Department
Huntleigh Technology PLC
310-312 Dallow Road
Luton
Bedfordshire
LU1 1TD

Patents ADP number (if you know it)

506907003

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
(day / month / year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
(day / month / year)

8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if

Yes

- a) any applicant named in part 3 is not an inventor, or
- b) there is an inventor who is not named as an applicant, or
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See note (d))

Patents Form 1/77

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Description 4 /

Claim(s) 2 /

Abstract 1 /

Drawing(s) 1 + 1 *RS*

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*) -

Request for preliminary examination and search (*Patents Form 9/77*) ✓

Request for substantive examination (*Patents Form 10/77*) ✓

Any other documents -
(please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature

Shahin Thake

Date 11 December 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

Tracey Hall (01582) 745812

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INTERMITTENT PNEUMATIC COMPRESSION DEVICE

The present invention relates to an intermittent pneumatic compression system, in particular an intermittent pneumatic compression device incorporating warming.

The device consists of an intermittent compression garment, made from flexible materials, that fits around the lower limb.

Existing intermittent pneumatic compression (IPC) devices comprise a wrap around device, wrapped around a lower limb and held in place with hook fasteners. The device has air bladders that are inflated by a pump to apply pressure to the limb. This pressure empties the veins in the limb. On release of pressure, by exhausting the bladder, there is a hyperaemic response (increased amount of blood) in the arterial system.

Such IPC devices are known to increase flow in the major blood vessels and over time, alleviate the symptoms of arterial disease. These existing IPC systems for arterial treatment operate at high pressures with a sudden filling of the air bladders.

The present invention seeks to make improvements.

Accordingly, the present invention provides a pneumatic compression (IPC) device comprising a device to be wrapped around a limb, the device having air bladders inflatable by a pump, to apply pressure to a limb to empty the veins in the limb, and releasing that pressure by exhausting the bladder, to promote a hyperaemic response (increased amount of blood) in the arterial system, and the device having warming means.

The combination of compression and warming is more efficient than systems that provide just IPC alone, or warming alone. IPC acts on the tissues at the site of compression, empties the veins, to promote a hyperaemic response in the arteries and so improves arterial flow.

Over time, collateral flow in the diseased arteries is improved. The additional warming promotes flow to the superficial tissues by means of vasodilatation of the arterioles and capillaries. This warming augments and
5 compliments the effects of IPC and the overall effect is greater than using each method alone. Localised heating of tissues is known to increase flow to the tissues where ulcers and lesions occur and in doing so, help to cure them. Therefore, a combination of compression and warming
10 improves significantly the general flow in the limb, both nutritional flow into the limb via the arteries and drainage of fluids at the lesions. Preferably, the pressure applied to the limb is low and gradual, such that the IPC device of the present invention operates at
15 much lower pressures than existing IPC devices. The gradual filling of the bladders and warming is far more comfortable and well tolerated by users, ensuring patient compliance.

Advantageously, the IPC with warming device acts
20 upon systemic flow and superficial tissues at the same time. Preferably, the warming means includes a electrically heated flexible material, more preferably the material is located adjacent to the bladders. In another preferred embodiment, the warming means is the
25 air inflating the bladders being heated. Preferably, the outer layer of the device is insulating to retain the heat.

The present invention is described by way of example below, with reference to the accompanying drawings in
30 which:

Figure 1 is a schematic diagram of a preferred embodiment of the invention; and

Figure 2 shows a cross-section of the garment in Figure 1 along X-X.

Referring to Figure 1, the device consists of an intermittent compression garment 1, made from flexible materials, that fits around a lower limb.

Figure 1 shows the wrap around garment to be held in place with hook fasteners 2, although other means such as a zip, or even a slip on garment are possible.

The device has air bladders 3, that when inflated apply pressure to the limb. This pressure empties the veins in the limb. On release of pressure, by exhausting the bladder 3, there is a hyperaemic response (increased amount of blood) in the arterial system.

The bladders 3 are made from flexible plastic film, welded together to form an air tight enclosure, with an integral supply hose 4. The bladders 3 can be one or more and take any form. The bladders are inflated to a pressure and time duration appropriate to a desired therapy by means of a pump (not shown) via hose 4.

We have found that an effective cycle is 60mmHg pressure compression for 12 seconds, followed by a decompression for 49 seconds, which allows the venous system to refill. We have also found that that when compared to existing systems our IPC protocol of low pressures (60mmHg) for short periods (10 seconds), is all that is needed to achieve a hyperaemic response and therefore increase arterial flow.

The garment 1 incorporates a heating to apply warming to the tissues, typically between 32 and 42 degree centigrade. The warming increases blood flow in the adjacent tissues. AS shown in Figures 1 and 2, the heating is achieved by passing an electric current through a conductive material 5 located adjacent to the bladders 3 that coverts the electrical energy into heat. Possible materials include conductive polymers, carbon fibres, wire elements and foils. Alternatively, heating could also be provided by warmed air, exothermic chemical packs and heat exchangers.

The outer layer 6 of the garment 1 incorporates a layer of thermally insulating material, to enhance heat retention. The inner liner adjacent the skin of the user may be breathable to avoid sweating.

CLAIMS

1. A pneumatic compression (IPC) device comprising a device to be wrapped around a limb, the device having air bladders inflatable by a pump, to apply pressure to a limb to empty the veins in the limb, and releasing that pressure by exhausting the bladder, to promote a hyperaemic response (increased amount of blood) in the arterial system, and the device having warming means.
2. A pneumatic compression (IPC) device as claimed in claims 1, 2 or 3 wherein the warming means includes a electrically heated flexible material.
3. A pneumatic compression (IPC) device as claimed in claims 1 or 2 wherein heated flexible material is located adjacent to the bladders.
4. A pneumatic compression (IPC) device as claimed in any preceding claim wherein the pressure applied is low and gradual.
5. A pneumatic compression (IPC) device as claimed in claim 4 wherein the pressure applied is 60mmHg pressure compression for 12 seconds, followed by a decompression for 49 seconds, which allows the venous system to refill.
6. A pneumatic compression (IPC) device as claimed in any preceding claim wherein air bladders are inflated by heated air from the pump.
7. A pneumatic compression (IPC) device as claimed in any preceding claim wherein the outer layer of the device is thermally insulating.

8. A pneumatic compression (IPC) device substantially as hereinbefore described and with reference to the accompanying drawing.

ABSTRACT

The device consists of an intermittent compression garment 1, that fits around a limb having bladders 3, that when inflated by a pump (not shown) apply pressure to a limb to empty the veins in that limb and upon release of that pressure, by exhausting the bladder 3, there is a hyperaemic response (increased amount of blood) in the arterial system. The bladders 3 are made from flexible plastic film. The device 1 also warms the tissues, typically between 32 and 42 degree centigrade. The heating is achieved by passing an electric current through a conductive material 5 adjacent the bladders 3 that converts the electrical energy into heat. Alternatively, heating could also be provided by warmed air, exothermic chemical packs and heat exchangers.

The outer layer 6 of the garment is of thermally insulating material for heat retention.

(Figure 1 to accompany abstract)

Figure 1

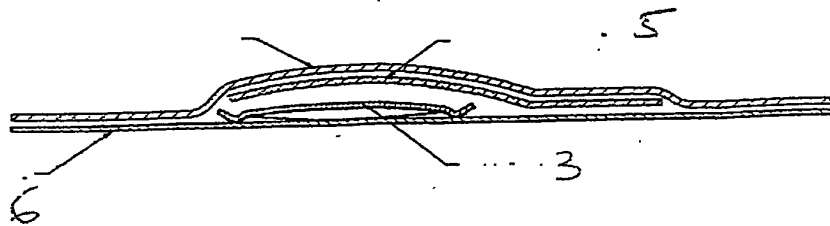
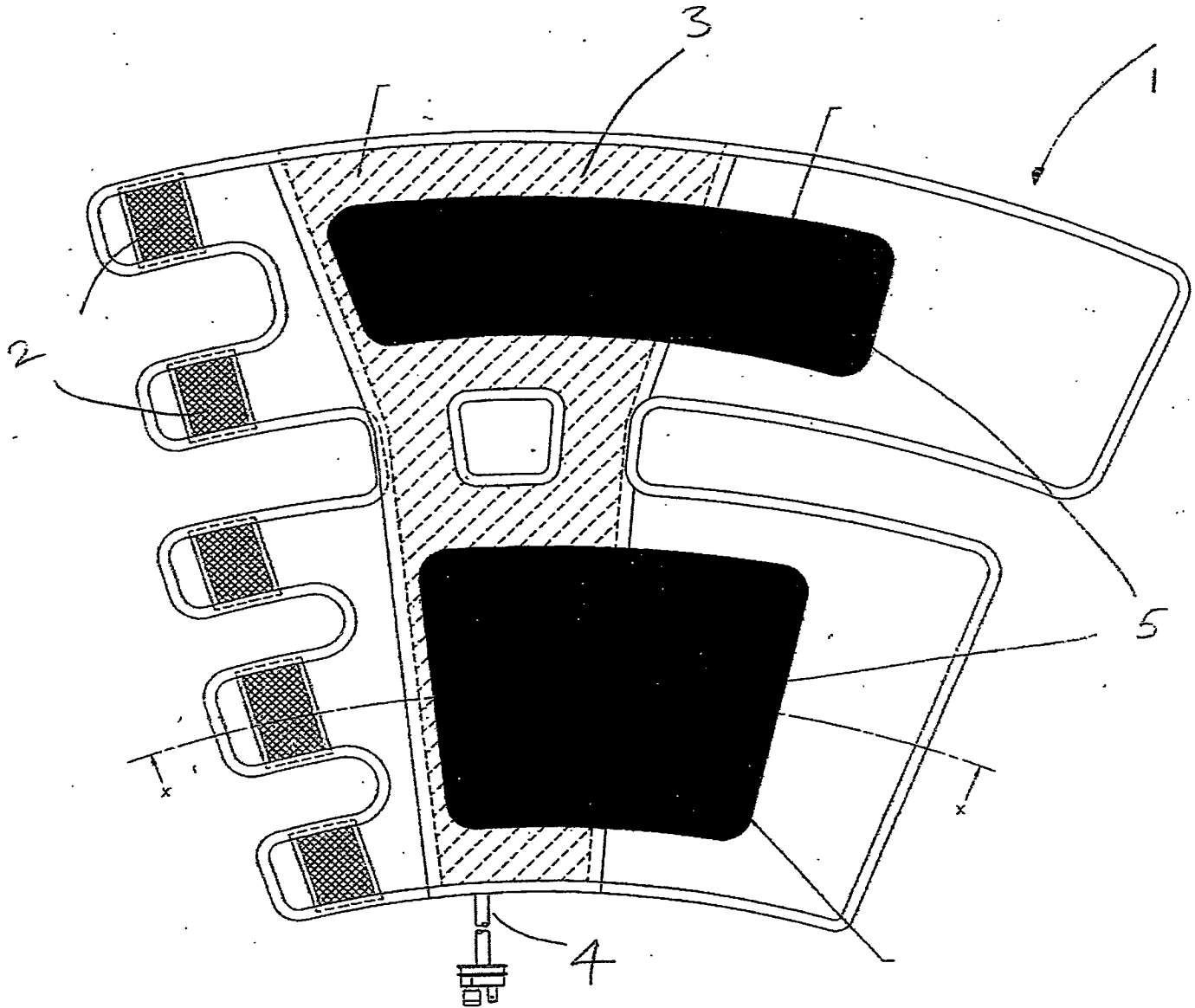


Figure 2

Document made available under the Patent Cooperation Treaty (PCT)

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